

Bureau of the Budget

Research money (left) grows slightly; Development holds steady.

charged with the support of basic research for its own sake—policy-directed shifts in direction are perceptible.

The Foundation cannot, under the law, support applied research.

Nevertheless, it has been decided that the Foundation will emphasize programs in oceanography, atmospheric sciences, chemistry and the social sciences, where, in the words of an analysis by the Federal Bureau of the Budget, “fundamental knowledge is required . . . if significant progress is to be made on some of the critical problems facing society in such areas as air and water pollution abatement, weather modification, urban redevelopment and exploitation of marine resources.”

And in further support of the decision to put research at the service of national objectives, the only new starts proposed by R&D budget planners are in such departments as Transportation, Housing and Urban Development, the Post Office and those doing work on air and water pollution. These programs, totaling less than \$200 million, are nevertheless regarded as highly significant. HUD, for instance, will more than double its R&D to \$54 million.

One notable victim of the tradeoffs that had to be made in the planning of an austere budget proposal is what has come to be known as the Centers of Excellence program.

This effort to inject significant sums of money into the programs of good university research centers in the effort to make them first rate has been singled out many times as a most promising and imaginative effort of Federal research planners.

But the pioneering National Science Foundation has been forced to cut back on this effort, while the National Aeronautics and Space Administration and

National Institutes of Health could do no more than hold steady at relatively modest levels.

The Defense Department’s Project Themis is the only Centers of Excellence program proposed for growth next year, and this is certain to become an early victim of Congressional efforts to hold back what seems to be non-essential Federal spending.

DEFENSE

Missiles and phenomena

The Department of Defense was faced with requests from all its constituent parts for “the largest sum of money ever asked at one time of anyone by anybody in the history of man,” according to an officially faceless official. From the welter of requests, science and technology emerged with more budget money than observers had expected.

Most of the \$8 billion in R&D money programmed, of course, would go into straight military uses: biggest gainer is the Sentinel antiballistic missile, which will take some \$1.1 billion from all sectors of the budget, including R&D.

The Manned Orbiting Laboratory, which will put the United States Military officially into the piloted space race for the first time, will account for another large piece of the pie: a raise to \$600 million in fiscal 1969 from the \$430 million this year.

Overall, DOD’s backing of R&D would grow eight percent over 1968, an advance of \$602 million to a new total of \$8 billion.

Basic research—which the Pentagon has suddenly renamed “phenomena-oriented research”—into such areas as

crystal growth, plasma dynamics, energy conversion, polymer chemistry, information theory and sensory physiology will, according to the budget appendix, receive \$659,394, a jump from the current year’s \$563,415. But the Pentagon, in the midst of its most stringent budget review in history, plans to hand off many similar programs—including radio astronomy at Arecibo, Puerto Rico and the cryogenic accelerator at Stanford University—to other agencies. The National Science Foundation expects to pick up at least the Arecibo tab.

Among other developmental efforts, DOD expects to define contracts for the superhard silos for some of its Minuteman 3 missiles, the F-106X interceptors, over-the-horizon radar, new nuclear guided missile destroyers and the light, intratheater transport plant.

Sure to stir the Congress is a request for 30 more F-111B’s, the Navy version of the controversial TFX swing-wing fighter. For Air Force versions—the A and the D—Defense wants \$1.1 billion to buy 163 planes. Still another version, the fighter-bomber FB-111, would cost \$550 million for 74 aircraft.

More pressure from Asia—in Vietnam, Korea, or nearby trouble spots—could force an even more stringent review of the already stringently reviewed figures. Then research, if not development funds, could be deeply cut.

THE ATOM

Warheads, reactors, research

For several years the Atomic Energy Commission has boasted that it spends more money on peaceful nuclear development than on weapons production.

The fiscal 1969 budget makes a close thing of it. Of the \$2.75 billion appropriation request, \$1.14 billion is directly attributable to the military program, and more is distributed in small pieces through the budget.

Of the military expenditures, \$840 million will go for weapons development and production, mostly for warheads for the Minuteman 3 and Poseidon missiles and the Sentinel antiballistic missile system. An additional \$184 million is requested for plants to make the weapons.

Nuclear reactors for Navy propulsion make up another \$115 million of the budget request.

On the civilian side, a big increase in appropriations requests for nuclear power development shows the AEC’s enthusiasm for that booming industry. Wide commercial acceptance of light water reactors has led to a tailing off of AEC expenditures in that category, from \$13 million last year to \$11 million in fiscal 1969. But this is offset by

a jump of \$20 million to \$91 million for development of high-gain breeder reactors, mostly for the kind cooled by liquid sodium. In the last two years the budget for breeder reactors has almost doubled.

In high energy research, the AEC is asking for \$25 million this year to start construction of the 200-400-BeV accelerator at Weston, Ill. Already in hand and being spent is \$7.3 million appropriated last year for design and engineering of the huge research facility. The AEC will also ask for authorization this year of the full \$250 million the project is supposed to cost in the next six years.

Operating expenditures for the agency's physical research program will go up \$15 million in fiscal 1969, mostly in the high energy physics section, whose budget request goes from \$113 million in 1968 to \$120 million. AEC officials say the request allows for small increases in a number of research projects, to cover rising costs. No provision has been made yet to pick up specific projects now run by the Department of Defense, which has said it is getting out of the high energy research business. However, some general fund money is available in the budget in case a worthwhile project needs support.

The new budget also includes an increase in the biology and medicine research program, from \$88 million to \$92 million.

The Plowshare program, to develop peaceful uses for nuclear explosives, is cut \$2.5 million this year to \$14.5 million. AEC hopes to carry out several experiments in fiscal 1969, however, in cooperation with industry.

Most likely tests are Project Bronco, now being negotiated, which would attempt to free shale oil by breaking up the underground rock; Dragontrail and Rulison, which, like last December's Gasbuggy, are aimed at freeing natural gas; and Sloop, a copper mining project.

NASA

Apollo funds down

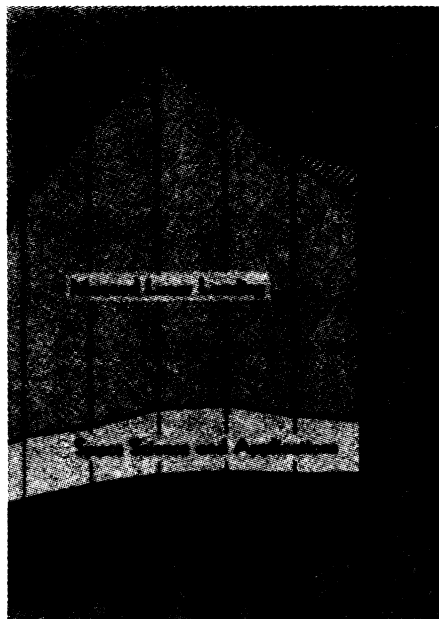
Man-in-space still tells the National Aeronautics and Space Administration's money story. The Administration's request is for some \$218 million less than last year's authorization (and \$597 million less than the year before). Reduction of more than half a billion dollars in funds for the Apollo program is at the root of the decrease.

NASA's big year was fiscal 1966, when it spent more than \$5.9 billion and had more than 420,000 people working for its contractors. Now things are cooling off rapidly, as revealed by

a request for some \$4.37 billion and a contractor work force now at 300,000 and dropping by 4,000 a month.

The launch pad fire that killed three astronauts a year ago delayed Apollo nine months and cost the program some \$410 million, but it is now back on the track, and next year may well see Americans on the moon. NASA's new concern is for what comes after. The biggest increase in the Administration's budget request is thus for the Apollo Applications Program.

Apollo Apps, as its mentors call it, received a bit more than \$250 million this year. In 1969, the Administration hopes to have almost \$440 million for the program, even though the fire pushed the first Apps flight into 1969 and Vietnam has now shoved it into at least 1970. The first such mission will include a multi-manned orbiting workshop, plus a second launch to revisit it. In 1971, NASA hopes to have



Bureau of the Budget

NASA: the lunar line points down.

a giant solar observatory that will dock with the workshop and be revisited three times that year.

In addition, NASA hopes the Apps program will lead to two manned lunar landings per year, following the first Apollo spectacular.

There have been reports—officially denied—that some scientists in NASA's scientist-astronaut program are thinking of quitting because so much of their time is spent in training for space flight and so little in scientific research. True or not, the fact remains that science, while not sinking into oblivion, is barely holding its own in the proposed new budget.

Physics and astronomy are hovering at about the fiscal 1968 level, a little more than \$140 million. There are two

more Orbiting Astronomical Observatories yet to come in that costly and much-delayed program, but the authorization request is for \$5.2 million less than this year's because the agency thinks it has finally worked the bugs out of the satellites. The complex, successful and valuable Orbiting Geophysical Observatory program will end after two more launches, and its request is down 35 percent.

Biology is up about 20 percent in the new request, most of which, however, is for human studies related to long-term space flights.

The sum requested for lunar and planetary exploration is down to \$107 million from \$140 million last year, since both the Surveyor and Lunar Orbiter programs are over. With budget pressures tighter even than last year, the agency no longer proposes the elaborate Voyager program of flybys, orbiters and landers to Mars and Venus.

Instead it plans an abbreviated program that will ignore Venus entirely, at least through 1973, and replace Voyager's costly, radar-guided softlanders with simpler parachute-equipped rough landers. The estimated cost of the overall program will be about \$500 million, barely a fifth that of a full-scale Voyager effort.

Up substantially for the second year in a row is NASA's earth applications program, which includes practical projects such as weather satellites. The biggest chunks of the increase are requested for a huge survey of what could be done with an earth resources satellite, and for advances in the multi-purpose Applications Technology Satellites, which check out new ideas for weather, communications, geodetic and a variety of other satellites.

Other agency requests for new ocean and earth applications satellites have been put off by the Bureau of the Budget pending completion of the NASA study and any possible non-satellite options it might turn up.

The two stars of the agency's Advanced Research and Technology office in the coming fiscal year, if the Administration has its way, will be the NERVA nuclear rocket and the quiet airplane engine research program. NERVA, which has been on-again-off-again for years, is now proposed in a smaller version, which could be mounted atop the giant Saturn V booster instead of its present third stage. The NERVA upper stage, NASA says, could double the rocket's payload to another planet.

In aeronautics, the X-15 and B-70 research aircraft will both come to the end of the line this year. Except for hypersonic research in the X-15's speed range, however, the Administration plans that all NASA's aircraft programs will get a financial boost.